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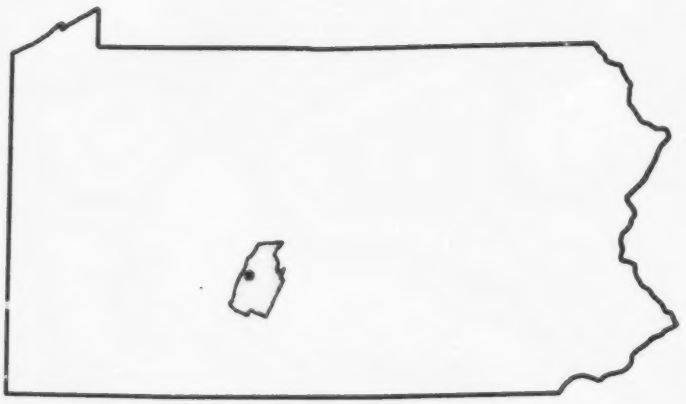
COMPLETED
ORIGINAL

FLOOD INSURANCE STUDY

CITY OF ALTOONA, PENNSYLVANIA
BLAIR COUNTY



JULY 16, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 420159

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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Flood Boundary and Floodway Map

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

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FLOOD INSUPANCE STUDY
CITY OF ALTOONA, PENNSYLVANIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Altoona, Blair County, Pennsylvania, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study represent a revision of the original analyses prepared by Engineering and Associated Design Services for the Federal Emergency Management Agency (FEMA), under Contract No. H-4757. The work for the original study was completed in March 1980. The hydrologic and hydraulic analyses in this updated study of Mill Run were prepared by the Soil Conservation Service (SCS) of the U. S. Department of Agriculture. The work for this updated study was completed in October 1985.

1.3 Coordination

In April 1978, streams requiring detailed study were identified at an initial Consultation and Coordination Officer's (CCO) meeting attended by representatives of FEMA, the City of Altoona, and Engineering and Associated Design Services (the original study contractor). Results of the hydrologic analyses were coordinated with the Susquehanna River Basin

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Commission (SRBC), the U. S. Geological Survey (USGS), and the U. S. Army Corps of Engineers (COE). On March 10, 1982, the results of the study were reviewed at a final CCO meeting held with representatives of FEMA, the city, and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Altoona, Blair County, Pennsylvania. The area of study is shown on the Vicinity Map (Figure 1).

The entire lengths of Burgoon Run, Mill Run, Spring Run, and Brush Run within the corporate limits were studied by detailed methods. Mill Run was revised to incorporate a more up-to-date analysis. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and construction.

2.2 Community Description

The City of Altoona is located in the central portion of Blair County in central Pennsylvania, approximately 130 miles west of the City of Harrisburg and approximately 100 miles east of the City of Pittsburgh. The Township of Logan completely surrounds Altoona. According to the U. S. Bureau of the Census, the population of Altoona was 62,900 in 1970 (Reference 1).

Burgoon Run, within the city, is 0.6 mile long and has a drainage area of 15.26 square miles. Mill Run has a total length of 1.9 miles within the city and a total drainage area of 24.26 square miles. Spring Run has a length of 0.95 mile and a drainage area of 6.75 square miles. Brush Run is 0.9 mile long with a drainage area of 3.22 square miles.

The floodplains of the study area have been almost totally developed, except for some building lots available for single-family residences and small private businesses.

The climate of Altoona is humid continental. The monthly mean temperatures range from 71.9 degrees Fahrenheit (°F) to 27°F. The annual average precipitation, which is fairly evenly distributed, is 44 inches with an average recorded snowfall of 43 inches (Reference 2).

2.3 Principal Flood Problems

The history of flooding on the streams within Altoona indicates that flooding can occur during any season of the year. Most of the major

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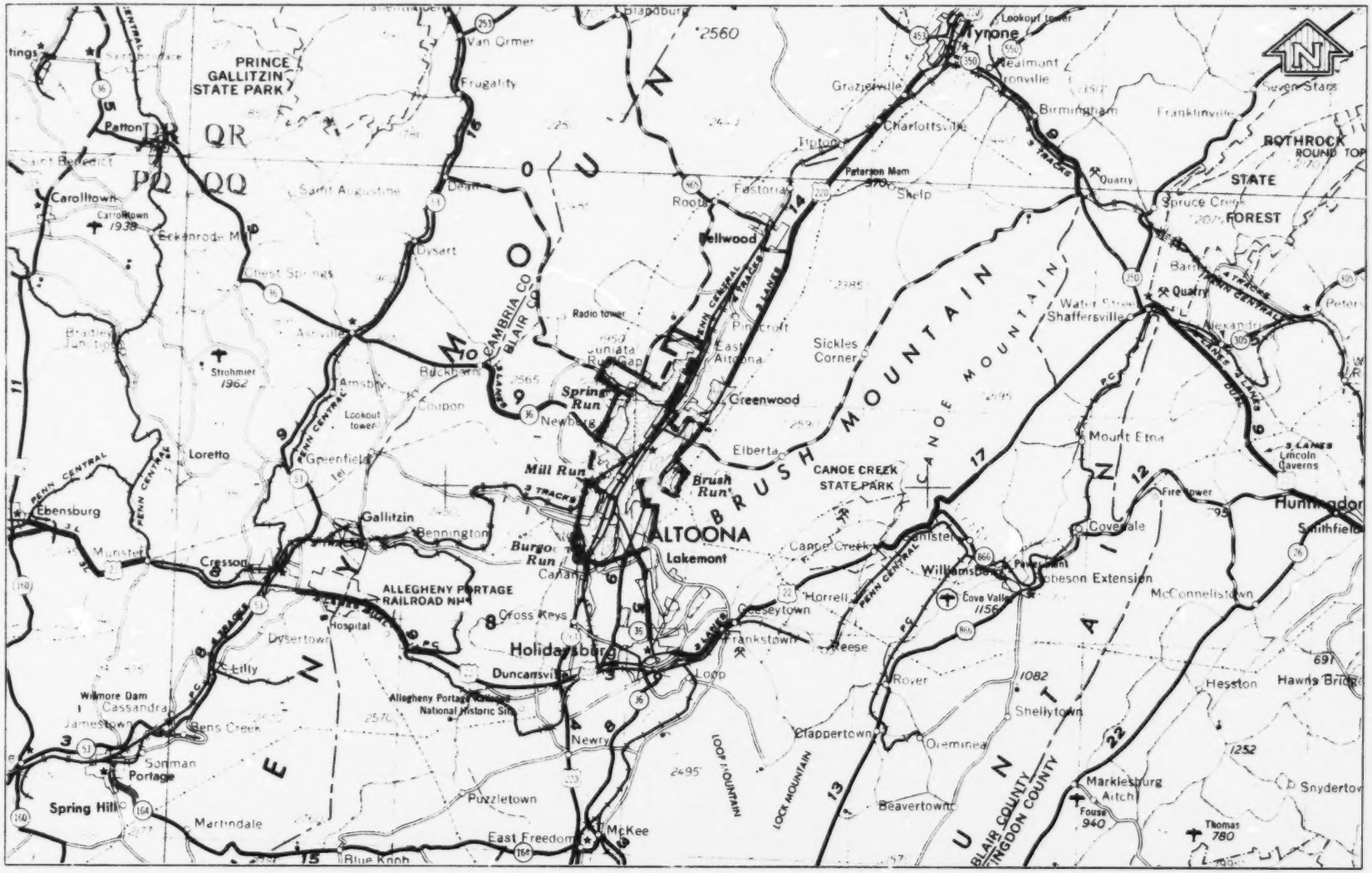

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

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floods have occurred during February, March, April, and May, and are usually the result of spring rains combined with snowmelt. Storms occurring during the early summer months are often associated with tropical storms moving up the Atlantic coastline.

Mill Run is an ungaged stream and, therefore, has no official records of stream stage and discharge. According to investigations, residents' input, weather reports, and newspaper articles, the flood of record occurred in 1936. There is evidence that Mill Run inundated portions of the floodplain in 14 different years; however, the most property damage occurred in September 1967 (Reference 3).

Burgoon Run, Brush Run, and Spring Run have also flooded on occasion. No high-water marks are known to exist within the study area.

Figures 2, 3, 4, and 5 show potential flood heights on the streams studied by detailed methods in the City of Altoona.

2.4 Flood Protection Measures

The city and county have periodically undertaken channel clearance and straightening for Burgoon Run, Mill Run, Spring Run, and Brush Run. There are no local restrictions on development within the floodplains of these streams other than one by the Pennsylvania Department of Environmental Resources, which requires permits for any construction that would alter the stream channel or create any obstruction to stream flow.

Mill Run Reservoir and Allegheny Reservoir are water-supply reservoirs located in the Mill Run watershed. They have only a nominal effect on major flood crests. Plans are proposed to realign the channel, construct levees, and reconstruct bridges in the 31st Street area of Mill Run (Reference 3). Kittanning Reservoir and Lake Altoona are located in the Burgoon Run watershed but also have only a nominal effect on major flood crests.

Non-structural measures of flood protection are also being utilized to aid in the prevention of future flood damage. These are in the form of land-use regulations adopted from the Code of Federal Regulations, which control building within areas that have a high risk of flooding.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special

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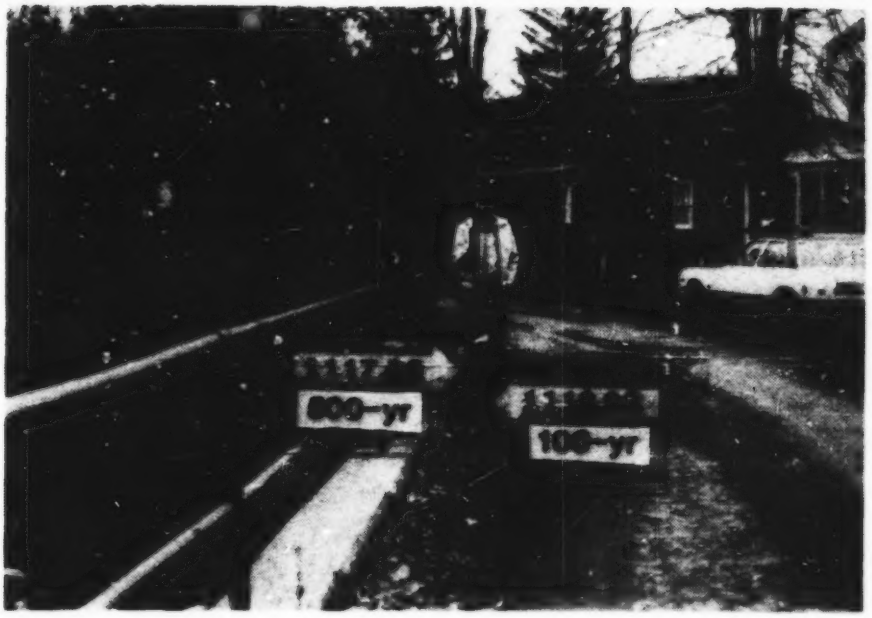

Figure 2 - Potential 100- and 500-year flood heights on Burgoon Run at Broad Avenue. The 100-year flood height is 0.2 foot above the road, and the 500-year flood height is 0.9 foot above the road (upstream face).

Figure 3 - Potential 100- and 500-year flood heights on Mill Run at West Chestnut Avenue. The 100-year flood height is 4.3 feet above the road, and the 500- year flood height is 6.4 feet above the road (upstream face).

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Figure 4 - Potential 500-year flood height on Spring Run at Fourteenth Avenue. The 500-year flood height is 1.9 feet above the road (upstream face).

Figure 5 - Potential 100- and 500-year flood heights on Brush Run at Fourteenth Street. The 100-year flood height is 1.3 feet above the road, and the 500-year flood height is 2.0 feet above the road (upstream face).

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significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

Peak discharges for Burgoon Run were computed using regression equations and appropriate map coefficients as outlined by the COE study entitled Hydrologic Study, Tropical Storm Agnes (Reference 4). This analysis followed the standard log-Pearson Type III method as outlined by the Water Resources Council (Reference 5).

Peak discharges for Spring Run and Brush Run were computed by applying the appropriate regression models and coefficients from Water Resources Bulletin No. 13 (Reference 6).

In this updated study, the peak discharges for Mill Run were computed using Technical Release No. 20, Computer Program, Project Formulation, Hydrology (Reference 7).

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges".

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BURGOON RUN					
At confluence with Mill Run	15.26	1,700	3,100	3,900	6,400

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MILL RUN					
At confluence with Burgoon Run	13.39	1,970	3,200	3,965	6,600
At downstream crossing of Union Avenue	*	1,940	3,400	4,327	8,090
At upstream crossing of Union Avenue	7.89	624	1,340	1,800	3,700
At point approximately 1,450 feet downstream of CONRAIL	*	555	1,190	1,597	3,280
At CONRAIL	6.93	500	1,080	1,455	2,650
SPRING RUN					
At downstream corporate limits	6.75	715	1,200	1,450	2,050
BRUSH RUN					
At downstream corporate limits	3.22	400	680	815	1,150

*Drainage area not available

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analysis of Mill Run were obtained from the SCS (Reference 8). Cross sections for the backwater analysis of the remaining streams were obtained from aerial photographs at a scale of 1"=1,000' (Reference 9). All below-water sections, bridges, and culverts were field surveyed to obtain elevation data and structural geometry.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the streams and floodplain areas. The channel "n" values for Burgoon Run ranged from 0.040 to 0.045, and the overbank "n" values ranged from 0.040 to 0.100. The channel "n" values for Mill Run ranged

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from 0.017 to 0.045, and the overbank "n" values ranged from 0.015 to 0.080. For Spring Run, the channel "n" values ranged from 0.040 to 0.045, and the overbank "n" values ranged from 0.025 to 0.060. The channel "n" values for Brush Run ranged from 0.030 to 0.040, and the overbank "n" values ranged from 0.025 to 0.060.

Except for Mill Run, water-surface elevations of floods of the selected recurrence intervals were computed through the use of the COE HEC-2 step-backwater computer program (Reference 10). For Mill Run, floods of the selected recurrence intervals were computed using the SCS WSP-2 step-backwater computer program (Reference 11). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for Burgoon Run were determined using coincident flood peaks. Starting water-surface elevations for Mill Run and Spring Run were determined using the slope/area method. Starting water-surface elevations for Brush Run were obtained from the Flood Insurance Study for the downstream community of the Township of Allegheny (Reference 12).

The acceptability of all assumed hydraulic factors, cross sections, and hydraulic structure data was checked by computations that duplicated historic floodwater profiles.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing floodplain management measures.

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4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps (References 8 and 13).

The 100- and 500-year floodplain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

The floodway for Mill Run was taken from the previously effective Flood Insurance Study for the City of Altoona (Reference 14). Due to the differences in datum and changes in the stream channel caused by erosion, deposition, and maintenance since the original cross sections were surveyed, floodway data for the cross sections on Mill Run have been

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Burgoon Run								
A	0	73[2]	518	7.5	1,079.8	1,079.8	1,079.8	0.0
B	700	113[2]	450	8.7	1,083.3	1,083.3	1,083.9	0.6
C	1,100	64[2]	310	12.6	1,089.0	1,089.0	1,089.0	0.0
D	1,700	70	342	11.4	1,098.1	1,098.1	1,099.0	0.9
E	2,025	70	360	10.8	1,102.7	1,102.7	1,102.7	0.0
F	2,988	74	476	8.2	1,117.4	1,117.4	1,117.4	0.0
G	3,608	52	289	13.5	1,125.1	1,125.1	1,125.1	0.0
Spring Run								
A	180	51	209	6.9	1,159.0	1,159.0	1,159.6	0.6
B	641	40	294	4.9	1,167.7	1,167.7	1,167.7	0.0
C	841	50	261	5.6	1,168.2	1,168.2	1,168.2	0.0
D	1,696	42	133	10.9	1,175.1	1,175.1	1,175.1	0.0
E	2,334	20	109	13.3	1,185.2	1,185.2	1,185.2	0.0
F	2,769	33	145	10.0	1,190.3	1,190.3	1,190.3	0.0
G	3,269	31	126	11.5	1,194.6	1,194.6	1,194.6	0.0
H	3,552	43	219	6.6	1,201.5	1,201.5	1,201.5	0.0
I	3,908	37	167	8.7	1,205.7	1,205.7	1,205.7	0.0
J	4,653	31	128	11.3	1,215.7	1,215.7	1,215.7	0.0
K	4,962	23	149	9.7	1,224.0	1,224.0	1,224.0	0.0
L	5,172	30	194	7.5	1,227.8	1,227.8	1,228.6	0.8

[1]Feet above corporate limits

[2]This width extends beyond corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA

(BLAIR CO.)

FLOODWAY DATA

BURGOON RUN - SPRING RUN

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Brush Run								
A	260	39	100	8.1	1,099.8	1,099.8	1,099.8	0.0
B	447	42	172	4.8	1,102.6	1,102.6	1,102.8	0.2
C	862	55	125	6.5	1,106.9	1,106.9	1,106.9	0.0
D	1,923	70	264	3.1	1,119.3	1,119.3	1,119.9	0.6
E	2,451	30	111	7.3	1,123.1	1,123.1	1,123.6	0.5
F	2,900	74	266	3.1	1,125.4	1,125.4	1,126.1	0.7
G	3,393	88	197	4.1	1,127.6	1,127.6	1,127.8	0.2
H	3,792	25	96	8.5	1,130.6	1,130.6	1,130.8	0.2
I	4,120	16	74	11.0	1,134.1	1,134.1	1,134.4	0.3
J	4,444	52	272	3.0	1,138.9	1,138.9	1,138.9	0.0
K	4,632	45	150	5.4	1,140.0	1,140.0	1,140.2	0.2
L	5,094	30	279	2.9	1,146.3	1,146.3	1,147.3	1.0

[1]Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA

(BLAIR CO.)

FLOODWAY DATA

BRUSH RUN

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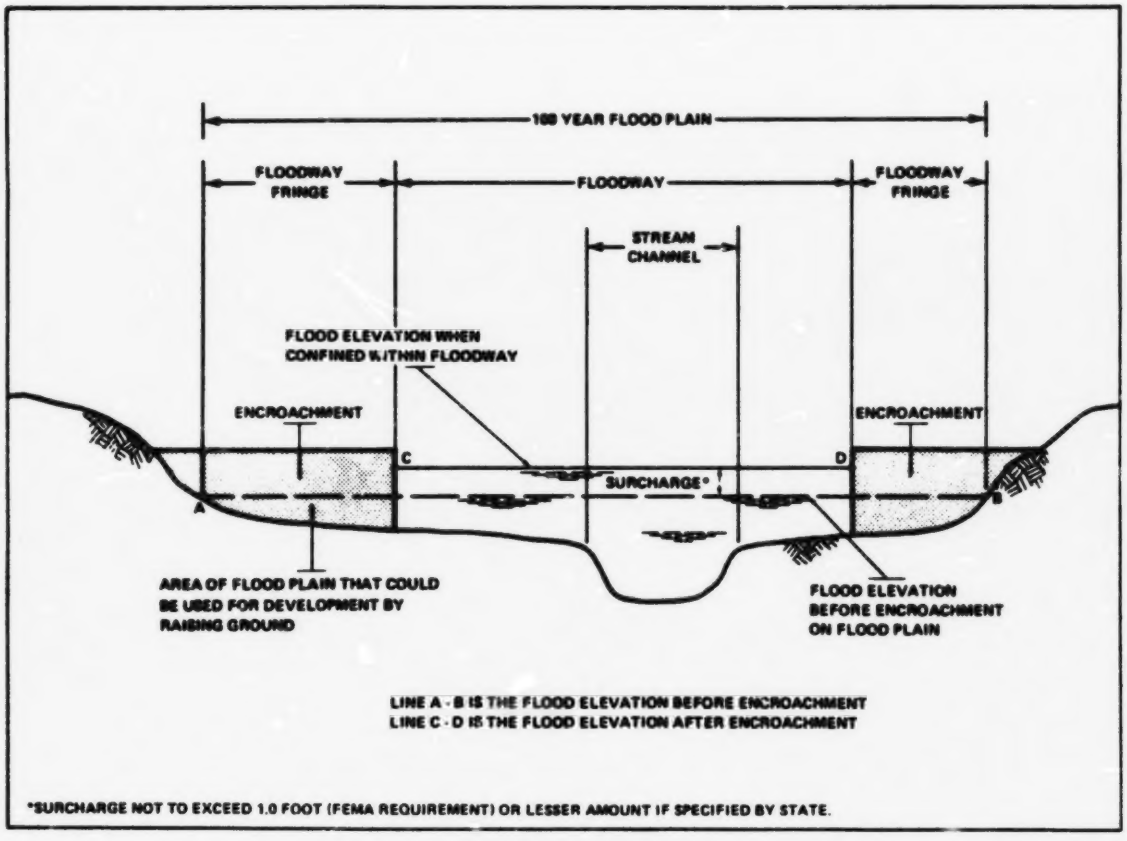
omitted. However, cross sections for the backwater analysis of Mill Run have been shown on the flood profiles and the Flood Boundary and Floodway Map (Exhibit 2) to aid in the identification of flood elevations at specific locations along Mill Run.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown. Portions of the floodway widths for Burgoon Run extend beyond the corporate limits.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 6.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 6

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5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the City of Altoona.

5.1 Reach Determinations

Reaches are defined as sections of floodplain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the City of Altoona are shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Burgoon Run							
Reach 1	06	-2.5	-0.8	+2.4	025	A5	Varies
Mill Run							
Reach 1	06	-1.2	-0.4	+1.1	010	A2	Varies
Reach 2	04,06	-2.6	*	*	025	A5	Varies
Reach 3	04	-4.0	*	*	040	A8	Varies
Reach 4	04	-2.2	*	*	020	A4	Varies
Spring Run							
Reach 1	02	-2.2	-0.7	+1.5	020	A4	Varies
Brush Run							
Reach 1	04	-1.4	-0.4	+0.8	015	A3	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

*Data not available

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

FLOOD INSURANCE ZONE DATA

BURGOON RUN - MILL RUN - SPRING RUN - BRUSH RUN

associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zones A2, A3, A4, A5, and A8: Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.

Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Altoona is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

A Flood Insurance Study for the Township of Logan has been prepared (Reference 15). The results of this study will be in exact agreement with the results of that study.

Due to its more up-to-date information, this study supersedes the previous Flood Insurance Study for the City of Altoona (Reference 11).

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7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Regional Director, Region III Office, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

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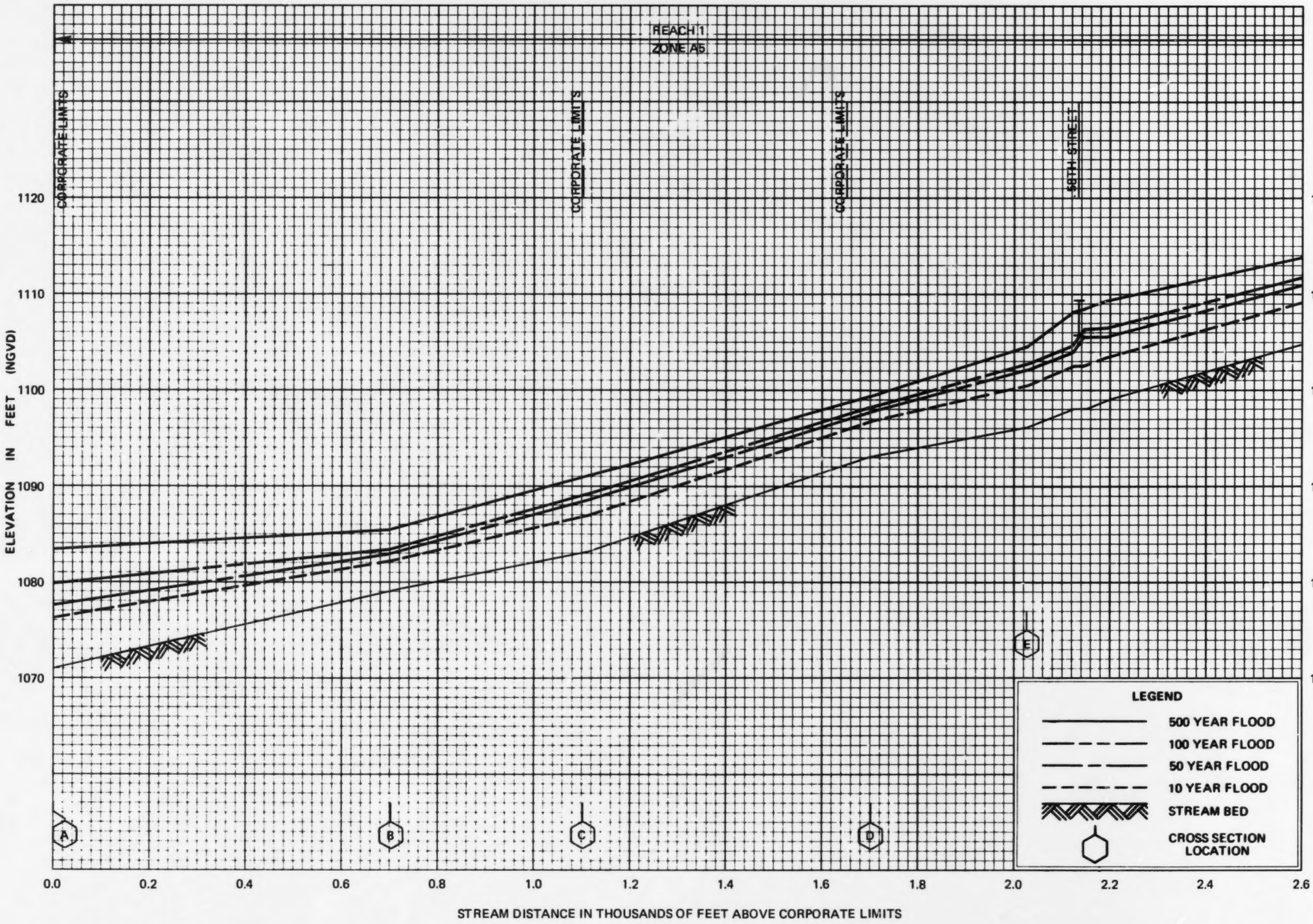

FLOOD PROFILES

BURGOON RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

01P

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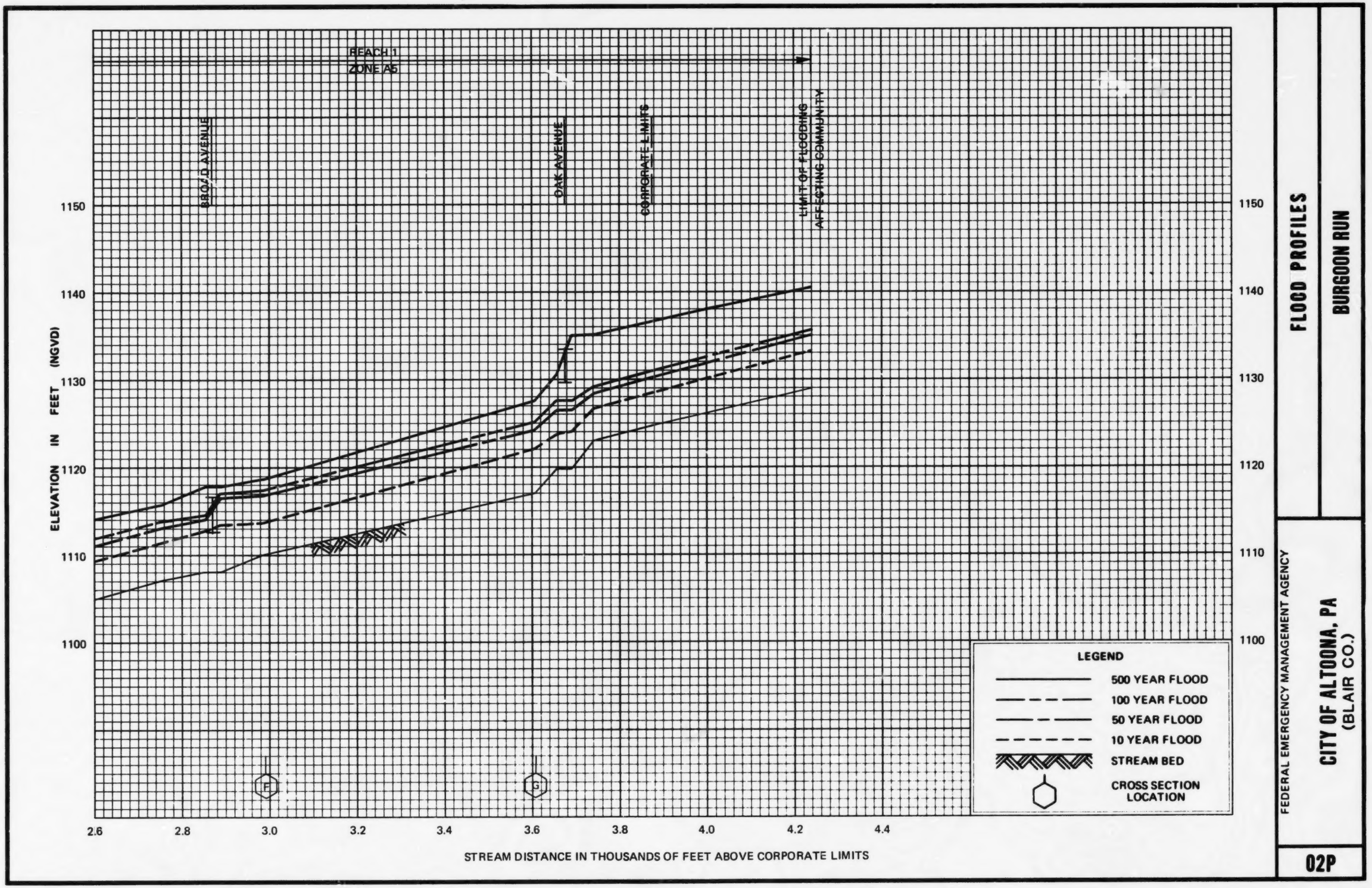

FLOOD PROFILES

BURGOON RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

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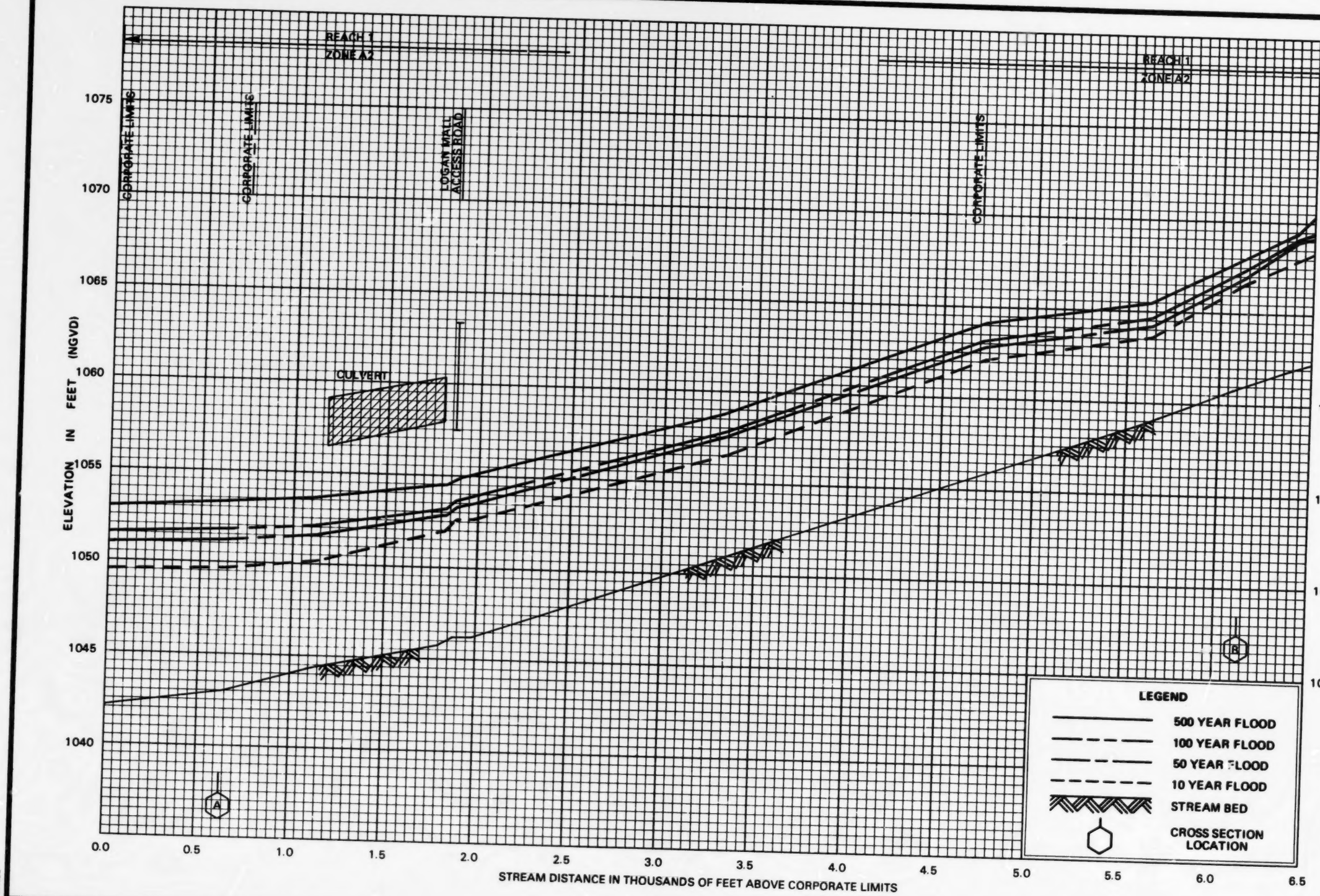

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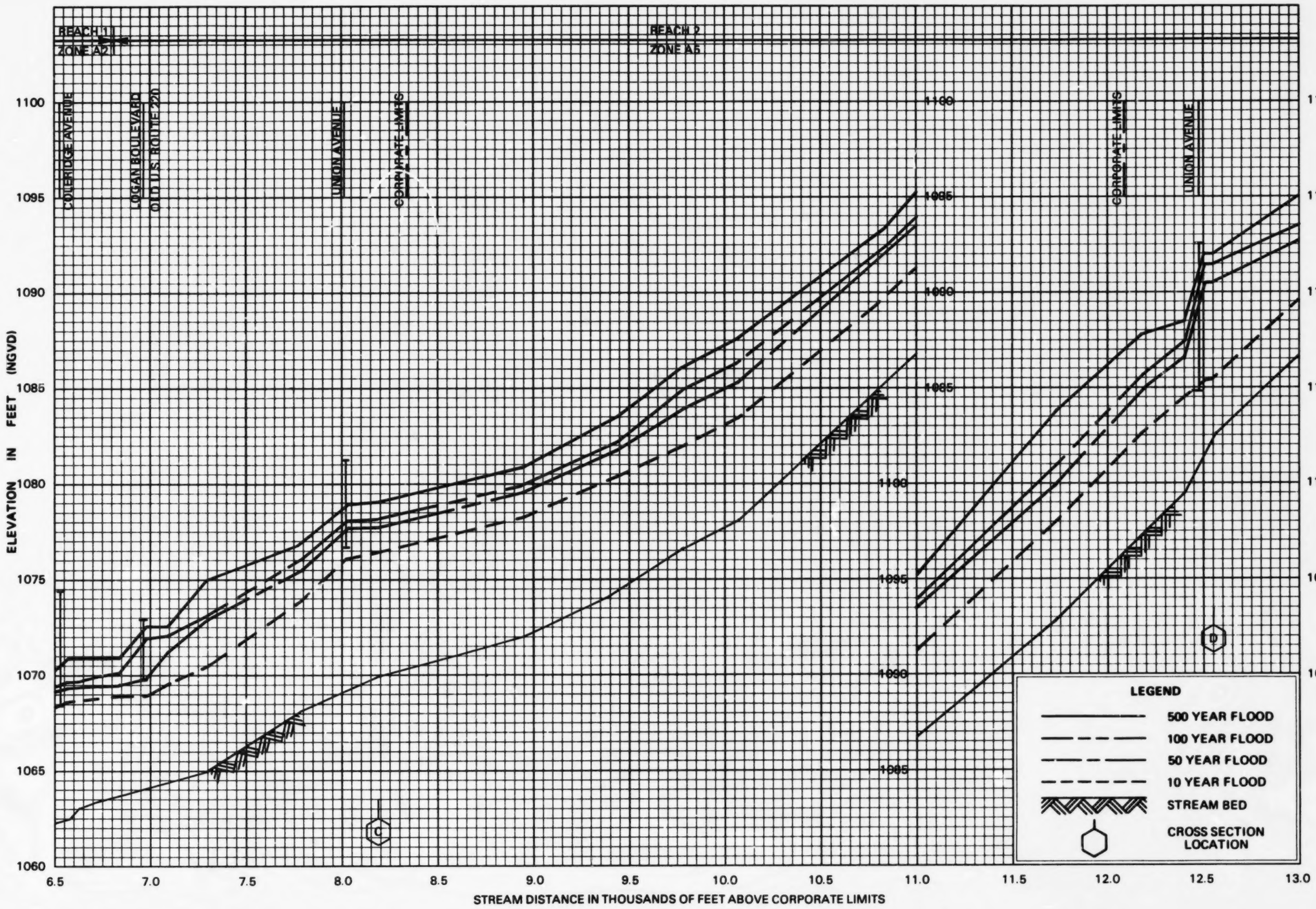

FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

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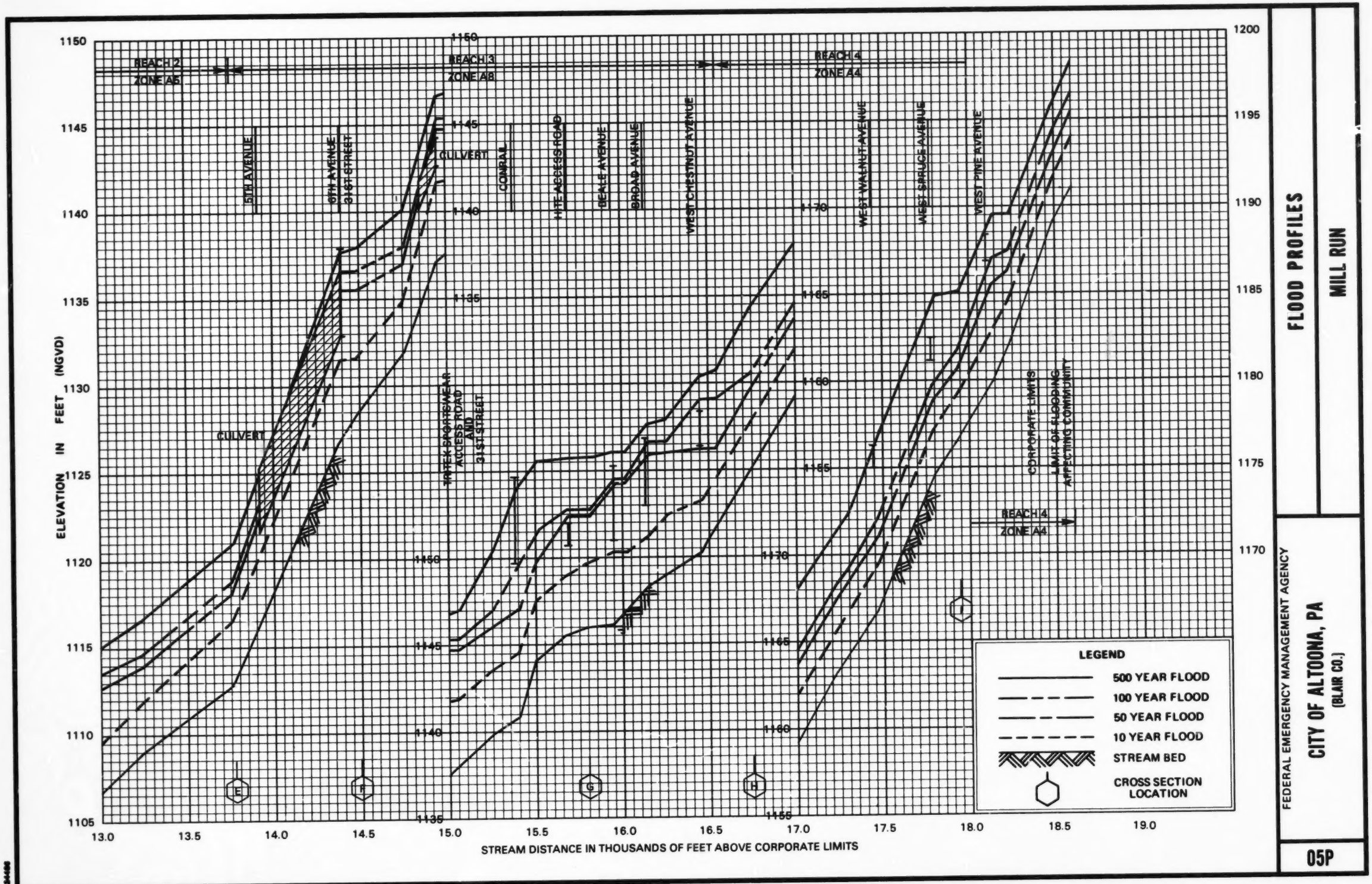

FLOOD PROFILES

MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

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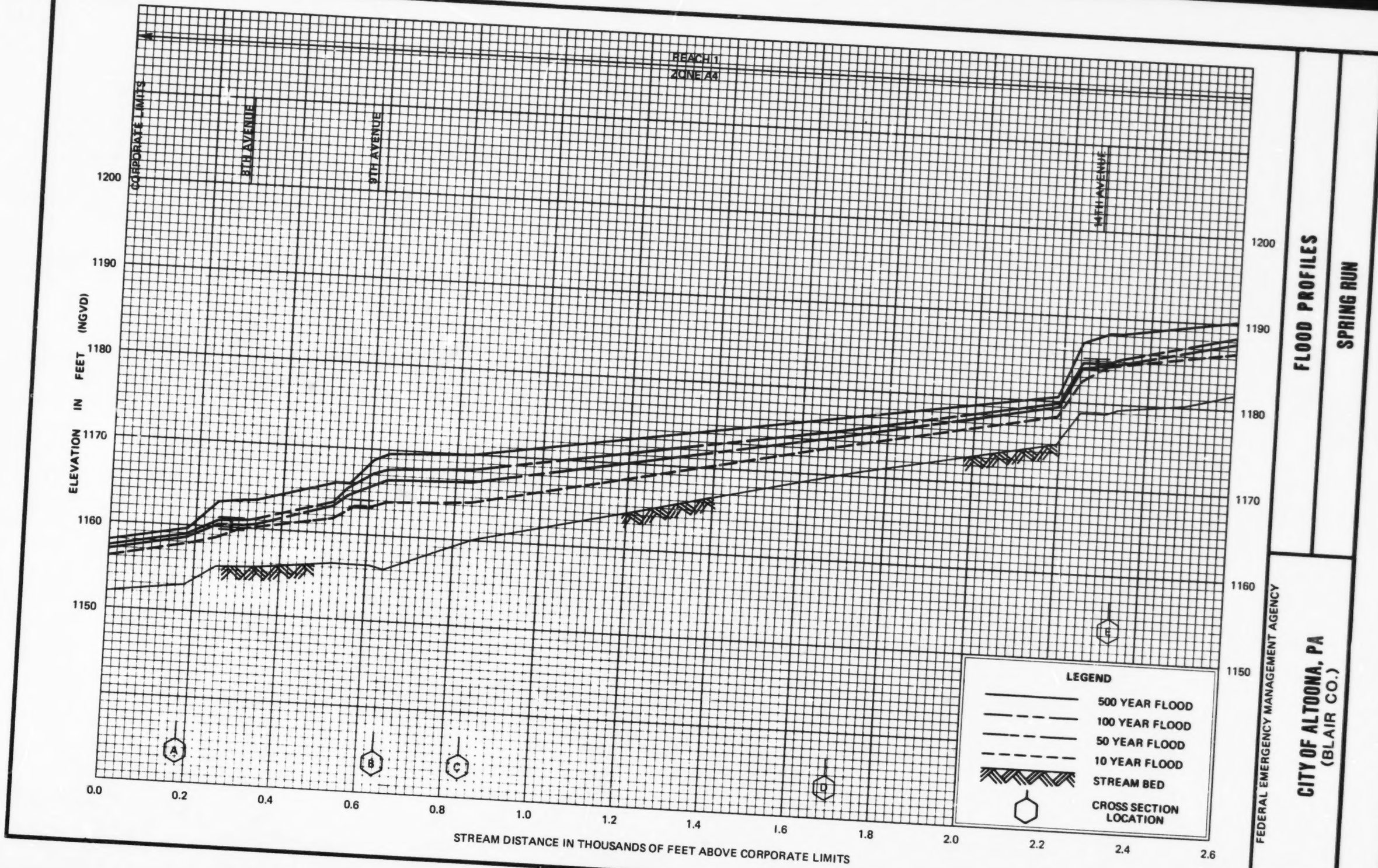

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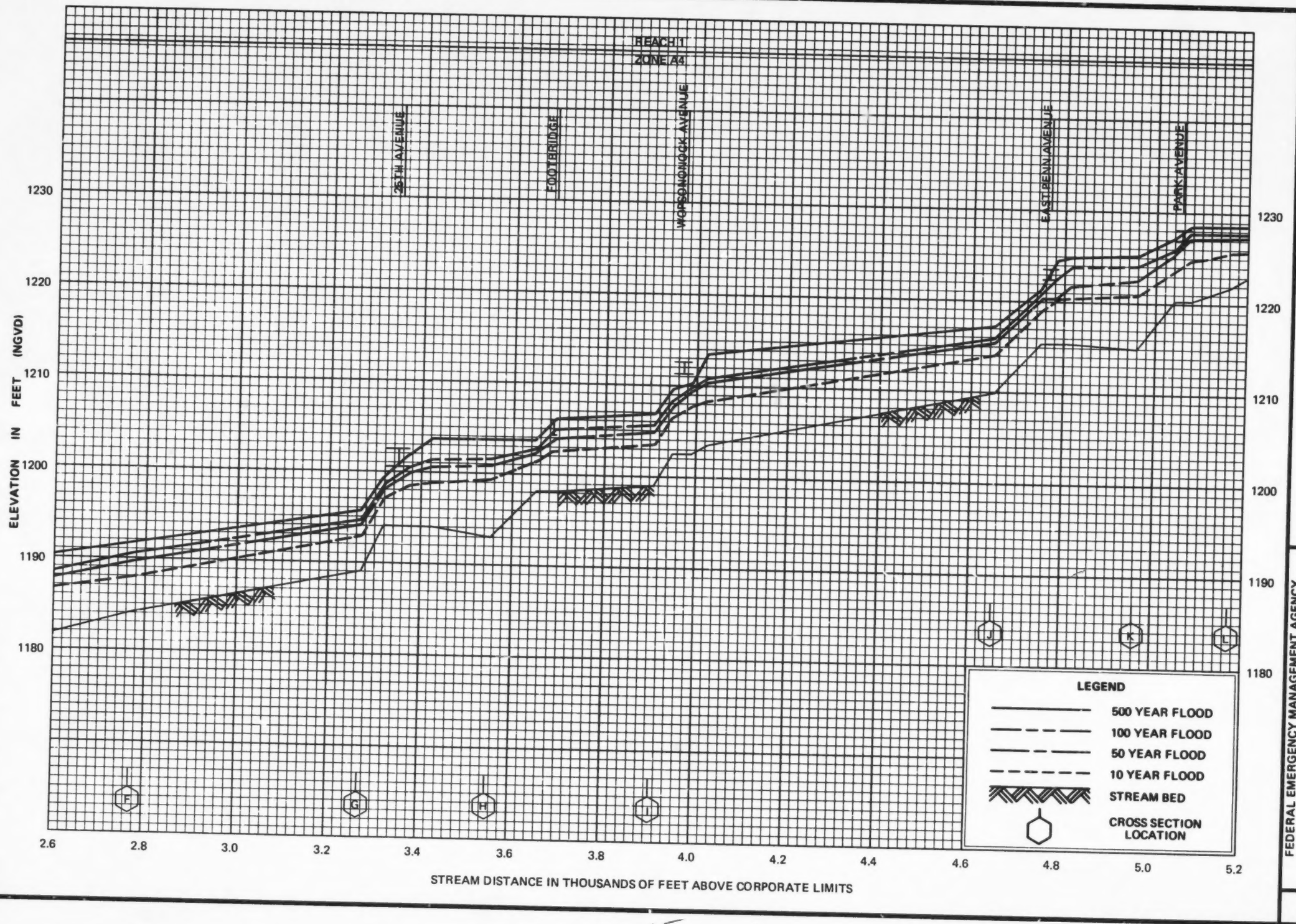

FLOOD PROFILES

SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

07P

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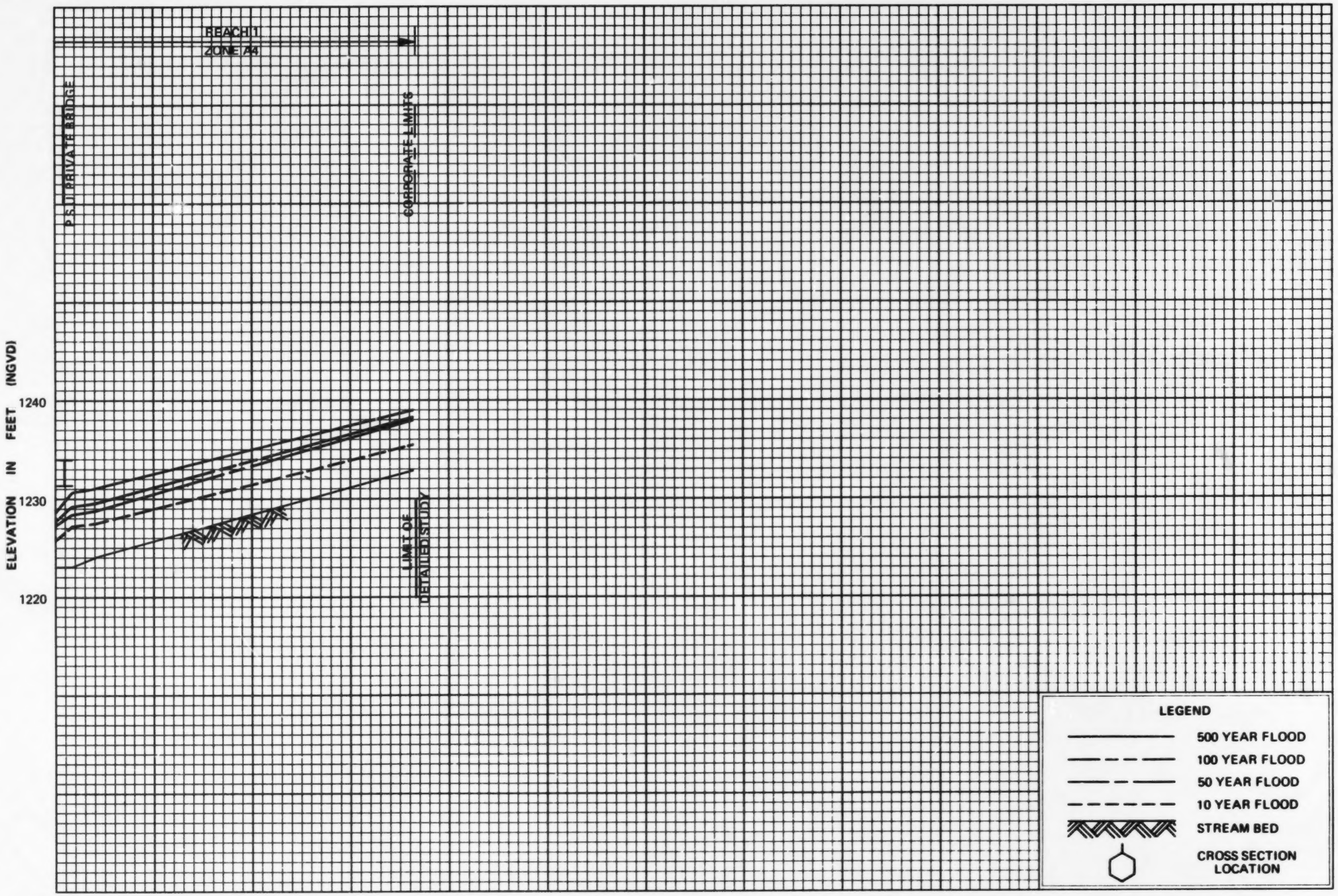

FLOOD PROFILES

SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

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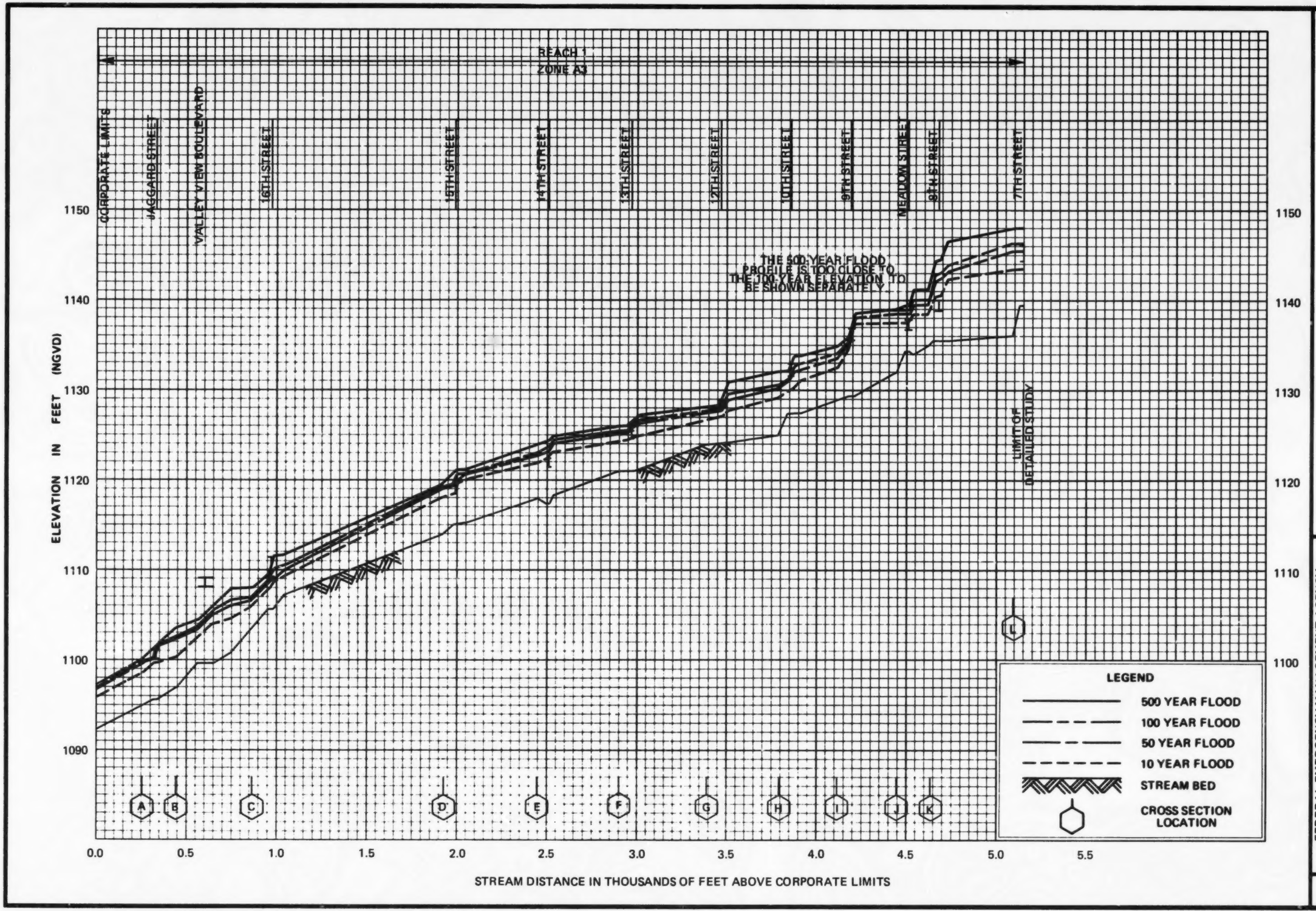

FLOOD PROFILES

BRUSH RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ALTOONA, PA
(BLAIR CO.)

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